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PET-CT Scan for Diagnosis of Inflammatory Diseases

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Positron Emission Tomography (PET)-Computed Tomography (CT) or PET/CT scan is defined as fusion technique that combines PET scanner and CT scanner in a single machine and acquires sequential images by two modalities at the same time that are combined into single superposed image. Thus biochemical active areas imaged by PET describes metabolic activity in the body those are precisely aligned or correlated with anatomic imaging obtained by CT scanning. Medical diagnosis are revolutionized by this imaging modality in many fields, by adding precision of anatomic localization to functional imaging, which was previously lacking from pure PET imaging. For example, many diagnostic imaging procedures in oncology, surgical planning, radiation therapy and cancer staging have been changing rapidly under the influence of PET-CT availability.[1] Integrated positron emission tomography/computed tomography with the glucose analogue, 2-[(18)F]-fluoro-2-deoxy-d-glucose (FDG), is an excellent fusion imaging technique for the evaluation of infection and aseptic inflammation. Now it is being recognized that, in addition to its established role in oncological imaging, FDG PET/CT also has clinical utility in suspected infection and inflammation. The technique can identify the source of infection or inflammation in a timely fashion ahead of morphological changes on conventional anatomical imaging techniques, such as CT and magnetic resonance imaging (MRI), map the extent and severity of disease, identify sites for tissue sampling, and assess therapy response.[2,3] FDG PET/CT exhibits distinct advantages over traditional radionuclide imaging techniques in terms of shorter duration of examination, higher spatial resolution, non-invasive nature of acquisition, ability to perform quantitative analyses, and the provision of a synergistic combination of functional and anatomical imaging. With the use of illustrative clinico-radiological cases, this article discusses the current and emerging evidence for the use of FDG PET/CT in a broad spectrum of disorders, such as fever of unknown origin, sarcoidosis, large vessel vasculitis, musculoskeletal infections, joint prosthesis or implant-related complications, human immunodeficiency virus (HIV)-related infections, and miscellaneous indications, such as immunoglobuline related systemic disease.[3-5] Recent studies,[5-7] revealed indications for the use of FDG in infectious or inflammatory diseases, namely localization of abnormal foci to guide the aetiological diagnosis in the presence of fever of unknown origin (FUO), diagnosis of infection in suspected chronic infection of bone and/or adjacent structures (osteomyelitis, spondylitis, discitis or osteitis including presence of metallic implants), diabetes with suspicion of Charcot's

neuroarthropathy, osteomyelitis and/or soft tissue infection, painful hip prosthesis, vascular prosthesis, fever in AIDS. On the other hand detection of the extent of inflammation in sarcoidosis, inflammatory bowel disease, vasculitis involving the great vessels and therapeutic follow-up of unrespectable alveolar echinococcosis, in which it may be used in the search for active localizations of the parasite during medical treatment and after treatment discontinuation. So it can be concluded that PET-CT scan can be utilized as a modality for imaging infection and inflammation other than oncologic diseases.

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